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THE MUSHROOM GROWERS'
ASSOCIATION

MGA

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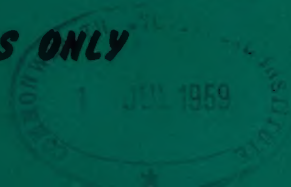
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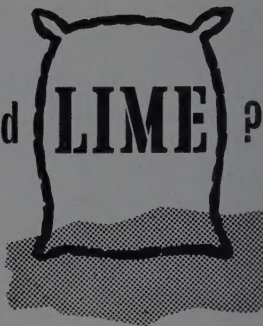
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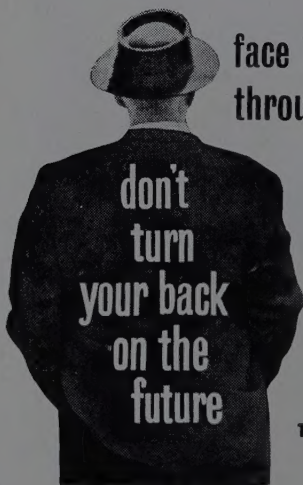
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EDITORIAL

DEAR MR. SALESMAN

and Mr. Retailer too!

Now that the soft fruit season is with us once again I feel that my friends and I, who are with you all the year round, through thick and through thin, in good times and in bad, tend to become a little neglected, pushed into the background as it were.

I know that many of you larger firms have a special market salesman who deals only with mushrooms, and I know of course that it is to your benefit as well as to the benefit of my producers, to get as high a price for me as you possibly can. The higher the price the higher your commission, and that is as it should be in any well ordered community. All this I understand and appreciate but do you really care as much about me as you ought at the time when my rival, the strawberry, makes her appearance on the market? She's pretty enough I know, with all her pleasing blushings but she's not quite as innocent as her blushes would have you and I believe. She's a fickle jade, here to-day and commanding all the attention and gone tomorrow, uncaring what happens in the months between.

I know too that your friends and my friends, the Retailer and the Customer, cannot be denied and again, that is as it should be in any free society.

It's amazing really how she queens it all over us and what a battering we have to take, just as soon as she appears, and I'm jolly glad when the time comes round for this all conquering Miss to depart. All I want you to do is to keep plugging away on my behalf and keep me in a position where I can be readily seen. If you do this I think too that I shall not be held quite so lightly by the public in general when this rival of mine, crimson of face and no wonder I say, takes the stage for her annual appearance. She's a gay deceiver Mr. Salesman and Mr. Retailer and you are both old enough and experienced enough egad, to put this forward Miss in her rightful place.

Yours sincerely,

"MR. MUSHROOM".

PART 3.

BRIEF OUTLINE OF AND CONTROL FOR MUSHROOM PATHOGENS, WEED MOULDS, INDICATOR MOULDS AND COMPETITORS

Prepared by

Dr. L. R. Kneebone and E. L. Merek

of the Department of Botany and Plant Pathology of the Pennsylvania State University for the occasion of the first

Mushroom Industry Short Course

9th—12th July, 1956, and revised by Dr. Kneebone for the Third Mushroom Industry Short Course, 23rd—26th June, 1958.

Common Name of Disease—YELLOW MOULD.

Scientific Name of Causal Organism—*Sporotrichum* sp.

Brief Description of Causal Organism—

The entire aspect of the mould when young, is white, but as the mycelium ages terminal and lateral, yellowish, 1-celled, ovoid conidia are produced on conidiophores that can vary from simple to branched with or without phialides.

Symptoms Produced—The mould as described above may be found throughout the compost, especially in synthetic compost in association with cobs. Yield does not seem to be affected except in extreme cases but the abundant spores can serve as food for mites.

Brief Life History of Causal Organism

—The spores are apparently airborne to the compost before casing, where they germinate, the mycelium grows, and more spores are produced.

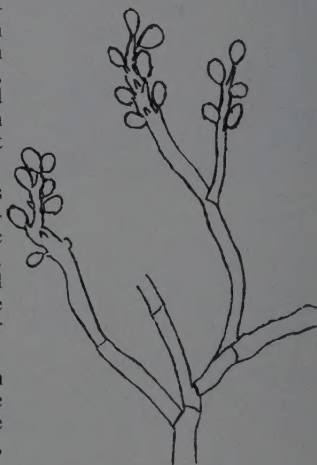
Secondary infestations would be rare after the soil is applied.

Most Frequent Source(s) of Infection—Air, infested spent compost.

How Spread—Airborne.

Predisposing Factors to Infection—Apparently prefers same conditions as spawn.

Suggested Control Measures—No special control is necessary since yield does not appear to be adversely affected. If the mould were to become abundant, mite infestation could increase in which case the spent house should be steamed before emptying or dust should be minimized during emptying and the spent compost removed far from the premises. It is



probable that this weed mould will not be a problem if the compost undergoes a thorough, well aerated sweat out.

Common Name of Disease—YELLOW MOULD.

Scientific Name of Causal Organism—*Sepedonium* sp.

Brief Description of Causal Organism—

The vegetative mycelium is whitish but the sporulating mould colony has a yellow-green appearance. Two kinds of spores are produced on sparsely verticillately branched, slender conidiophores: hyaline, 1-celled ovoid conidia, borne singly at the apex of the branches; and large, yellow, spherical, coarsely spiny chlamydospores.

Symptoms Produced—The mould as described above may be found throughout the compost. Yield does not seem to be affected except in extreme cases but this mould can serve as food to encourage a large population of mites.

Brief Life History of Causal Organism—

The spores are airborne to the compost where they germinate to form mycelium that soon produces abundant conidia and large yellow chlamydospores. Most infestations are primary.

Most Frequent Source(s) of Infection—Air, infested spent compost.

How Spread—Airborne.

Predisposing Factors to Infection—Apparently prefers same conditions as spawn.

Suggested Control Measures—To eliminate mould as a source of mite food requires thorough sanitation including steaming of spent house before emptying or minimizing dust load during emptying and disposal of infested compost. It is probable that this weed mould will not be a problem if the compost undergoes a thorough well aerated sweat out.

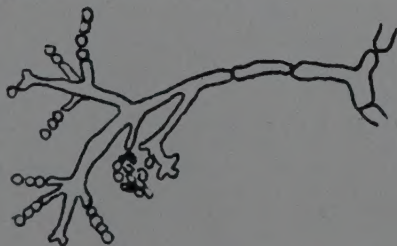


Common Name of Disease—ASTLEY MOULD.

Scientific Name of Causal Organism—*Spicaria* sp.

Brief Description of Causal Organism—

The mould is white to grey, appearing much like spawn. The spores are hyaline, 1-celled, globose and are borne in chains at the tips of widely divergent phialides arising from irregularly branched conidiophores.



Symptoms Produced—The mould itself is difficult to distinguish from spawn in that it produces a white to grey weft over and through the compost. It is, however, more powdery in appearance than spawn. Yield is reduced and sporophores are distorted having small flat caps with weak veils and a spongy stem discoloured toward the top. This is one of the heavily sporulating moulds that have caused respiratory difficulties among workers.

Brief Life History of Causal Organism—The spores are airborne to compost where they germinate to produce the white-grey mycelium which soon produces abundant spores that give the mould a somewhat powdery appearance.

Most Frequent Source(s) of Infection—Air, infested spent compost.

How Spread—Airborne.

Predisposing Factors to Infection—Apparently prefers same conditions as spawn.

Suggested Control Measures—Steam spent house before emptying or minimize dust during emptying and dispose of spent compost.

Common Name of Disease—BLACK WHISKER MOULD.

Scientific Name of Causal Organism—*Stysanus stemonitis*.

Brief Description of Causal Organism—The mycelium of the mould is dark. The sporulating structure consists of many hyphae organized into a column or synnema near the top of which dark, 1-celled, ovoid spores are produced in chains.

Symptoms Produced—The mould appears on and in the compost as dark grey to black whiskers or bristles. Spawn growth does not appear to be affected but some growers have associated patchy yield with the occurrence of this mould in the bed. This is one of the heavily sporulating moulds that have caused respiratory difficulties among workers.*

Brief Life History of Causal Organism—Spores are airborne to the compost or perhaps survive pasteurization. After germination of the spores the mycelium grows quite heavily through large sections of the bed and produces the sporulating structures mentioned above. As one uncovers this growth in the compost, clouds of spores arise from the disturbed area. Few if any secondary infestations occur after casing.

Most Frequent Source(s) of Infection—Air, compost.

How Spread—Airborne.

Predisposing Factors to Infection—Apparently prefers same conditions as spawn.

Suggested Control Measures—Infected house should be steamed before emptying or dust should be minimized during emptying and the infected compost removed from the premises.

*NOTE: Other moulds cause respiratory difficulties among mushroom workers, especially during the emptying operation; include *Aspergillus Flavus*, *A. fumigatus* and *Mucor pusillus*.



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COMPOSTS

By V. L. Barrow, B.Sc.(Agric.), N.D.A., F.R.S.A.

The use of animal manures for the improvement of cropping goes back to ancient times and composting is certainly not modern. However, it is only in comparatively recent times that an understanding of what goes on in the compost heap has been gained. Microbiologists have done considerable work during the last 30 years and are still carrying on research. As the number of growers who use compost is increasing every year it is useful to have a reasonable understanding of the processes involved.

It is fortunate that all animal and vegetable tissues are broken down or rotted otherwise life on this planet would become exceedingly difficult, to say the least. This breakdown of organic matter is done by micro-organisms consisting of bacteria, actinomycetes and fungi. All are found in soil but naturally a soil rich in organic matter contains more than a poor soil or one continually fertilised with chemicals. In the latter the fungi predominate and the population of the actinomycetes is generally very low.

It was once believed that the addition of manure to soil actually introduced bacteria and was in this way responsible for the increase in the bacterial population. It is now known that when sterilised manure is added to the soil there is a similar increase in bacteria. By the direct microscopic method manure has been found to contain 37,600,000,000 bacteria per gram. The chief of these are the Enteric Coli. This varies according to the quality and there is more when in heaps and less at high temperatures.

The influence of organic materials in controlling the development of disease-producing bacteria and fungi in the soil is due to the fact that the antagonistic organisms favoured by the manure, play an important role in suppressing the growth of the plant parasites. For instance bacteria are responsible for tyrocidine, fungi for penicillin and actinomycetes for streptomycin. Another factor in the use of composts is that soils rich in organic matter are less subject to seasonal variations and have a much less drainage loss.

With the increase in knowledge of what goes on in the compost piles it has become possible to have greater control of them and consequently improve them. As mentioned, the bacteria contained in a good stable manure actually die off very quickly but other micro-organisms take over the work of decomposition. Also, as a sterilised manure gives the same results as a fresh one it is possible to make composts from other sterilised organic materials. It is unfortunate that the word "synthetic" has been used to describe a compost made in this way as the process of composting is the same in each case.

There is a specific group of micro-organisms responsible for each step of breakdown and under each of the various conditions in the pile. This is why certain fundamental precautions must be taken to

insure that the final compost is ideal for use. The best composts contain a fair amount of air at all times for the bacteria that require air—known as aerobic—will be replaced by the anaerobic types in its absence. The amount of moisture present is very important.

To get a good sweet smelling compost the pile should have a moisture content of 60—70%. As the temperature of the pile increases some of this is lost by evaporation and should therefore be replaced by spraying with water at the time of turning. Insufficient water will definitely retard composting. On the other hand, if the moisture content is as high as 80—90% anaerobic conditions will very quickly arise, owing to the water displacing air, and a sour or evil smelling compost will result.

Generally, the differences between aerobic and anaerobic composts are found in the fact that the carbohydrates are not broken down as quickly in the anaerobic; there are more amines produced from the proteins (instead of ammonia in the aerobic compost); the temperature is much lower and rarely reaches pasteurisation point, and the lignin is not reduced. During composting a pile will lose 25—45% of its weight of organic matter. This is chiefly as a result of the breakdown of the various carbohydrates and as a result of this carbon dioxide is produced and in an aerobic compost this will escape to atmosphere. The centre of a pile can fairly quickly become anaerobic. The actual pH of a compost can be very misleading. The word sweet is used to describe the smell of the compost but this type should have a pH 6 to pH 7.

In an anaerobic compost methane and butyric and other organic acids are produced as by-products of breakdown, and consequently the compost is acid in reaction. However under some anaerobic conditions sufficient ammonia may be released to give at all events a temporary pH of as high as pH 8. Smell and appearance are the best factors in determining whether a compost is good or bad.

If the piles are too large an anaerobic condition may easily arise. Consequently I suggest that the stack be made about 5' high and 5' wide at the base. Sufficient water should be added at the time it is being made up. As the nitrogen/carbon ratio is very important the compost will generally be greatly improved by the addition of nitrogen in a suitable form. This applies to racing stable manure and in fact all except the very heavy manures, now more or less a relic of the past. Under these conditions the carbon compounds—carbohydrates, sugars, etc.—are quickly broken down as are also the proteins (nitrogen-containing compounds).

The temperature of the pile should be carefully watched. When it reaches about 140—150° F. the pile should be turned and if necessary more water added. If the pile is allowed to cool off as a result of lack of air and consequent decrease in bacterial activity it may be found difficult to get it up again. It is the eventual use to which the compost is to be put which decides the number of turns and the extent of rotting down. For example, a cucumber grower finishes his composting in the beds so he fills them on turning when the compost is high in rem-

perature. The mushroom grower wishes to breakdown all of the carbohydrates and finish with a compost that is only suitable for fungi—the bacteria, and actinomycetes having completed their work. For greenhouse use it is necessary to complete the initial stages and consequently as with the mushroom grower 3 or 4 turns may be necessary. For general outdoor use the compost may be used after 1 or 2 turns or, if allowed to dry out, be kept inactive until convenient to apply.

Another factor must be the materials used. Practically all organic wastes will compost though of course the various straws and grasses are most common. One thing that is very important is the age of the plant. After producing seed the plant has a much higher lignin content than in its earlier stages of growth. The slowest to breakdown is lignin. Therefore weeds if possible should be composted before seeding.

There are many advantages of using composted materials against using them in the natural state. For instance if straw was ploughed in, the composting process would take place in the soil and as it contains its nitrogen and carbon in the wrong proportion nitrogen is taken from the soil to enable the breakdown to occur. This causes so called de-nitrification and as a result plants may suffer a setback in their early growth. After proper composting seeding and planting may be done immediately after application. Also weed seeds are destroyed as well as eelworms if the temperature is raised over 140° F. The compost is pasteurised and most pests destroyed. During high temperatures the thermophilic organisms develop and as these are not normally present in the soil, a good compost adds them to the soil population. Generally speaking ammonia is only converted to nitrates in the soil—not in the compost pile—so the addition of compost to the soil promotes further bacterial activity keeping it “alive”.

The loss of weight in the organic matter is of no importance as far as loss of organics applied to the soil. The carbohydrates broken down would in fact encourage moulds. The richness, as far as actual manurial value, is doubled—e.g., nitrogen content of a completed compost can be double what it was at the start of composting.

The work of the nematodes in the breakdown of organic matter cannot be ignored. They are active during the early stages of composting but die off with the development of higher temperatures.

I have not mentioned the considerable physical improvement in soils where composts are used as most growers fully realise this fact. It is now possible to add nutrients to the compost pile to balance it from a plant food ratio point of view. The details of composting have already filled several books and here I have only attempted to cover the fundamentals.

With the increase in area of cultivated mushrooms there is naturally more “spent” compost available for farmers and horticultural growers ex mushroom growers’ farms. It is rather unfortunate that growers have certain prejudices about this material, and the word “unfortunate” may be emphasised because the reasons are often entirely wrong. As a so called “spent” mushroom compost is usually much drier than a freshly made pile it has a higher analysis on a weight basis, and its

analysis is considerably higher than farmyard manure or fresh stable manure. Most mushroom growers add nutrients to their composts to improve them, and although the mushroom in cropping must reduce these, it actually feeds primarily on nutrients which are of little or no interest to the plants grown by farmers and horticulturists. Consequently the compost from an efficient mushroom grower is often of much greater value to the market gardener than a similar product was some years ago.

Nevertheless, it must be pointed out that some caution must be exercised. For example, if insecticides have been used that would cause taint in vegetables, the compost is obviously not suitable for the market gardener. If a grower has recently limed his land then the heavy use of a mushroom compost complete with casing soil could have the effect of raising the pH of his soil to such an extent that calcium induced deficiencies may result in his crop. I know of several places where this has actually happened and it is very important. So on soils of a high pH or on crops that naturally dislike lime the casing material must be removed before use. The next point is that a mushroom compost which is very high in eelworm population is not to be recommended unless there has been an efficient cook-out in the growing houses. Finally, although most of the diseases and pests of mushrooms do not attack "green" plants, from the mushroom grower's own hygienic reasons the compost should be ploughed under as quickly as possible if used near mushroom houses.

Correspondence

THAT EDITORIAL

Here we go again—give the public what you think they ought to have and not what they want. I, personally, have a reputation for being a good shopper and I know what I want. If it is mushrooms, then to blazes with long stalks. What about other discerning shoppers? Are they going to pay 1/3d.—1/6d. a quarter for long-stalked mushrooms? Of course not for, believe me, the customer is *always right*. At the present time many of the bigger growers send mushrooms with 2 inches and upwards of stalks. Your suggestion must surely be unpopular with them! The smaller growers who take the trouble to present their produce decently should not consider that your editorial concerns them. Why should they, when I can name the market, date and wholesalers who had *sold* our stalks at 1/- lb. when a bigger grower's mushrooms were still *on offer* at the same price?

If every grower took the trouble to give the public what they want then there would not be so much squealing about prices. Don't blame the public but blame yourselves.

C. G. STOCKING,
South Luffenham.

SORRY!

It is much regretted that, owing to the printing trade dispute, this issue of The Bulletin has had to be put together and printed in rather a hurry. It is smaller than usual too and some regular features have had to be held over.

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WORLD'S PRESS DIGEST

Mushrooms continue to be a poor trade, heavy quantities meeting with keen competition from cheap salads. *Grower*, May 2/59. Mushrooms definitely a bright spot, with lighter supplies and more buyers. *Nurseryman Seedsman*, May 7/59. Mushrooms were overdone. *Nurseryman Seedsman*, May 14/59. Prices have never been so low. The hot weather is the main reason for the drop, but over-production is also blamed. "The increase in consumption has not kept pace with the increase in production," said one grower. *Grower*, May 16/59. Fewer mushrooms had been sent and these sold fairly quickly. *Nurseryman Seedsman*, May 21/59. With colder nights keeping down growth, supplies have been considerably less; the result has been a welcome improvement in price. *Fruit Trades' Journal*, May 23/59. Mushrooms once again were overdone. *Nurseryman Seedsman*, May 28/59. Mushrooms respond to the weather more than anything else; warm weather increases quantities but kills demand. Early this week the demand was very poor—"revolting", one salesman said, "Up and down like Tower Bridge". *Grower*, May 30/59. Woolworth stores in London and other areas are now selling mushrooms. Prices seem to vary from 1s. 1d. to 10d. a quarter. *Grower*, May 16/59.

Mr. John Stark, of Roydon, Essex, has 22,000 sq. ft. under production. He manages with very little labour. Apart from himself and Mr. J. Cilia, his manager, he employs two men, one part-time, but makes use of Italian labour during busy periods. 1½-page illustrated article in *Commercial Grower*, May 1/59.

Sub-Lethal doses of DDT to DDT-resistant female house flies reduced the number of eggs produced by 34%. Treatment of susceptible flies resulted in increased reproduction amounting to 18%.

P. E. Hunter *etal*, in *Journal of Economic Entomology*, 51, 1958

Judgment for £2,856 with costs was given in the High Court yesterday for Maurice Crouch (Growers) Ltd., against Lord Fisher. The firm said that Lord Fisher agreed to supply them with 500 tons of large carrots, but he delivered only 202 tons. *Daily Telegraph*, May 5/59.

The Tomato and Cucumber Board, in co-operation with the NFU, are setting up a Market Research Unit which would lead to improved methods with lower marketing costs.

Nurseryman Seedsman, April 23/59.

Eighty cows at Major A. Bramley's farm at Kidlington, Oxford, bed down each night on mattresses filled with plastic foam. With the spread of combine harvesting, long straw for bedding would become scarcer each year. Cows quickly pushed the shorter straw aside and lay on the bare concrete. *Daily Telegraph*, May 12/59.

A plant biologist, Dr. Noble, who retires shortly from the directorship of New South Wales Agricultural Department, was known throughout Australia 30 years ago as the "mushroom king". He experimented till he mastered the art of breeding mushroom spawn.

Daily Telegraph, May 12/59.

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To-day, successfully to win and hold a lion's share of the market the British grower has to be as meticulous with his grading, packing and marketing as he is with his cultural methods.

Nurseryman Seedsman, May 14/59.

Mr. John Hare, the Minister of Agriculture, visited West Sussex last Friday. He was most impressed by the mushroom prepacks at Farmers and Growers Industries.

Grower, May 9/59.

I am sure that one way to stop disastrous prices being returned to growers by salesmen who sell their produce on commission is to adopt some system whereby all produce is purchased at the grower's premises. Potatoes have to be purchased at grower's premises.

"Onlooker" in *Commercial Grower*, May 8/59.

There is nothing a housewife likes better than freshness, and with all due respect to other sections of the horticultural industry, there is little in the greengrocer's shop to rival the appeal of the white and pink gilled mushroom. The only way to get the mushroom into the shop in that condition is get up early, pick early and deliver early. It has always seemed to me that one day, may be sooner than many growers expect, they will have to get up bright and early in the morning, picking their delicate produce say before 9 a.m. and getting the mushrooms into the shops within an hour or two. *Commercial Grower*, May 29/59.

A G. Linfield Ltd., who have become well known for their range of Chesswood mushroom products, have now added five new lines to their can range. They are Chicken and Mushrooms, Ham and Mushrooms, Curried Chicken and Mushrooms, Mushrooms—Stems and Pieces, and Whole Sussex Chicken. The first two retail at 2s. 9d., the second two at 2s. 6d. and the last at 16s.

Grocer, May 9/59.

The restaurant at the new Mermaid theatre in the City of London will serve a Mermaid Pie (based on an old recipe of steak, mushrooms, kidney and oysters) with a glass of wine for 5s.

Egon Ronay in *Daily Telegraph*, May 20/59.

Mr. A. J. Bedding, who has been in charge of glasshouse and frame (and mushroom) experiments at Stockbridge House, is the new Director of Fairfield, Lancashire's glasshouse station (where mushroom experiment houses were completed last year). He succeeds Mr. G. F. Sheard, the recently appointed head of the new horticultural research department of the Glasshouse Crops Research Institute.

Commercial Grower, May 15/59.

Mr. Kenneth Symington, managing director of W. Symington & Co., said his firm use *Boletus edulis* in mushroom soup because "it seems when the English cultivated mushroom is dry it loses practically all its flavour. It goes very dark and makes a dark and bitty and unpalatable soup". This must not be the answer for all time; we hope that research on this matter will begin forthwith.*

Grower, May 16/59.

*Growers may ask: Why dry them?

Mr. and Mrs. Alan Lister, of Chatteris, Cambs, have converted an air-raid shelter in their garden for mushrooms. Of course, they now want

to expand, and the next project will be to convert a barn in their garden. Mr. Lister told our reporter that the markets want at least two-thirds more mushrooms than they are at present getting.

Cambridge Times, May 8/59.

An account sale gives prices realised and deducts charges, but is it impossible to ask that, for a period of say one month, detailed figures are prepared as to the final destination of the goods, whether to another market or direct to a retailer? This would be of immense help in re-organising the distribution which is so out of date.

Dr. C. B. L. Wiss in *Grower*, May 2/59.

Dr. W. Arnold, who is in charge of mushroom research in Eastern Germany, has succeeded in cultivating field mushroom strains. He now has two brown strains, six cream and one white. The spawn grows quicker and pinheads appear about ten days earlier than the normal spawns. Two of them promise to give good yields, but the shape needs to be improved. X-rays are being used to produce mutations. Two-page illustrated article by H. G. Schaffer in *Commercial Grower*, May 15/59.

Two illustrated articles on Mushroom Processing Equipment, by W. E. Larsen and D. H. Hughes, of the University of Delaware, detailing plans for the mechanical washing and drying of mushrooms, appear in AMI's *Mushroom News* for April and May, 1959.

We hear from Spain that mushroom growing there is being "extended at great speed". The Spanish currency is not in a good way, and all exports are encouraged. *Grower*, May 16/59.

Some basic facts you ought to know...

IN THIS JULY CALYPSO

Some basic facts we ought to know
On insulation, in this Calypso.
Growers sometimes prune the staff
To cut the wage-bill down to half,
While some expand like Brothers Knausts
And hope for expansion cutting costs,
And others yet in desperation
Subject their crops to heat privation.
If only we will open our eyes
And study the blue or starry skies,
And think of sun or falling frost
And how with cloud they both are lost,
We will discover with great elation
That much depends on insulation.

A cavity-wall is surely a 'must'
'Til a million years it be full of dust,
(With erosion, by then, 'twould be so bereft,
There'd be nothing but the cavity left)
Use plenty plaster of the openest kind
Then a cavity-roof by having it lined.
To repel the sun, copy the cloud,
And cover it all in the whitest shroud.
With doors and vents plaster-board lined
Our Coal Board in a plaster we'll find,
The safety of Suez won't cost us a thought,
And weather won't worry us, cold or hot,
And gladly we'll recall having opened our eyes
And studied the hazards of cloudless skies. F.P.

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During a recent TV broadcast regarding space travel the speaker mentioned the use of pond scums as possible food for future space pilots. These pond scums or algae with a great variety of other simple plants belong to that great division of the plant kingdom known as the *Thallophyta*. Mushrooms also belong to this lowly order of life so it is just possible that our delectable fungus may feature in the diets of space travellers.

To return to earth, this is the time of year when fungus and insect pests of mushrooms usually make their presence really felt. So to ensure disease free crops we must be specially vigilant and take any action that experience and knowledge have proved to be necessary.

If you have compost in store it should be kept dry and water from surrounding ground should not be allowed to run into it. Such water can carry spores. Insects are also well known spore transporters so they should not be allowed to breed in the vicinity of compost stacks or storage piles.

Use Clean Compost

Compost that has become old, short and wet should not be used and you should ensure that the vehicle which delivers the fresh compost has not been used for carting spent compost without having been properly disinfected.

The site on which composting take place should be concreted. Concrete is the only really cheap, satisfactory material for this purpose.

Earthen and stone flagged sites usually become a harbour for all sorts of pests. Even with a concrete site which is easily kept clean it is advisable to disinfect it occasionally with formaldehyde or cresylic acid.

During composting, that ancient habit of including some soil with the compost should be shunned like the plague but old beliefs die hard with some growers. Compost stacks should be built and turned in such a way as to enable the maximum amount of compost to achieve a temperature of 140 deg. F. or so.

Compost which is obviously undermade, rough and green, should not be filled into beds. An extra turn or two is well worthwhile even though it does upset schedules at times.

At filling or during the twenty-four hours prior to it, the compost should be put through the composting machine again to break up the lumps. Not only does this allow air to get to every inch but it facilitates the filling and levelling.

Beds and trays which have a longish open type of compost should be tamped very much harder than those with short wettish compost.

A good peak heat at around 135 deg. F. for twelve to forty-eight hours not only helps the compost but it eradicates most mushroom

*Reprinted by kind permission of "The Commercial Grower"

pests. Fumigating with insecticidal bombs towards the end of the peak heat is always desirable.

Always bear in mind the damage that can be done by olive green mould if the temperature gets above 150 deg. F. without sufficient air.

During the spawn running period it is advisable to keep the house closed.

Casing Materials

The best and safest casing material is wet peat mixed with ground limestone in proportions of roughly three parts of peat to one of ground limestone. If the peat has been taken from deep down in the bog it does not require sterilisation.

It is possible that most of the trouble during cropping can be traced to the watering operation. The ideal method of watering would be one where the casing could be watered without wetting the mushrooms.

Most of the fungi which attack the mushrooms on the beds got going just because the surface of the mushroom was moist.

In the absence of a method of watering beds without wetting the mushrooms the aim should be to get the mushrooms dried as soon after watering as possible. This can usually be achieved by increasing both ventilation and temperature immediately after watering.

The temperature should later be returned to normal. And what is a normal temperature? Around 60 deg. F. seems to be the average. Temperatures above that are more likely to encourage mushroom diseases than those around 56 to 58 deg. F.

Regular weekly treatment of cropping houses with the selective fungicide Zineb and a good insecticide like Gammaxene or Basudin is strongly recommended. And remember that controlling spore-bearing insects helps to lessen the spread of diseases.

Final Precaution

Many growers nowadays cook-out their cropping houses with steam before emptying them. A few hours at 140 or 150 deg. F. in addition to clearing up the bulk of any diseases present, moistens the compost and reduces the possibility of spread by wind during the emptying process.

To reduce the possibility of re-contamination, spent compost should be removed as far as possible from the vicinity of the production area. Time spent on brushing, cleaning and sterilising a house after emptying is well repaid.

The aim of successful growers is to start each house off in as clean and healthy a state as possible and keep everything moving from the moment the compost is ready to spawn. Have no hold-ups through low temperatures, delayed casing or suchlike. In fact do everything to get the house into production as soon as possible, keep it cropping and get the best possible yield in the shortest possible time.

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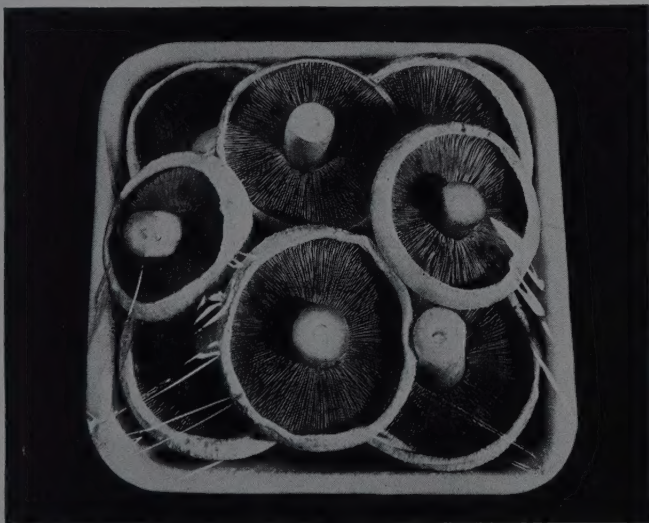
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